ORIGINAL

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of Amendment of Part 2 of the Commission's Rules to Allocate the 455-456 MHz and 459-460 MHz bands to the Mobile-Satellite Service	)	ET Docket No. 97-214

REPLY COMMENTS OF ORBITAL COMMUNICATIONS CORPORATION

Orbital Communications Corporation ("ORBCOMM") hereby replies briefly to the comments on the Commission's proposal to allocate approximately two megahertz of spectrum for use by the Non-Voice-Non-Geostationary Mobile Satellite Service("NVNG MSS").[1/] Although a number of the incumbent licensees in these bands objected to the proposed allocation, that seemingly orchestrated opposition was woefully devoid of any legitimate analysis or substance. To quote hamburger sellers and politicians, "where's the beef?"

A number of users (and several providers) of air-to-ground service in the 459-460 MHz band submitted (nearly identical) letters expressing concern about their loss of service if the spectrum was allocated to the NVNG MSS. Those commenting parties' fears are

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1/ *Amendment of Part 2 of the Commission's Rules to Allocate the 455-456 MHz and 459-460 MHz bands to the Mobile-Satellite Service*, ET Docket No. 97-214, FCC 97-363, released October 14, 1997 (hereafter "Notice").

misplaced. The Commission has not proposed to displace those users. Indeed, the proposed allocation of the 455-456 MHz and 459-460 MHz bands to the NVNG MSS will be subject to the international requirement that such use not constrain the present services using the band. As explained in ORBCOMM's initial comments in this proceeding (as well as in great detail in the record during the WRC preparatory process), there are numerous protections to preclude harmful interference to the air-to-ground users (and other incumbent services) from NVNG MSS satellite systems. Those protections include active monitoring and avoidance of transmissions on occupied channels (via a DCAAS or DCAAS-like system), interstitial channels, geographic dispersion, relatively low power and brief transmissions. In sum, the aeronautical users have no grounds to fear loss of their service or harmful interference as a result of the allocation.

Several broadcast parties also submitted comments opposing the proposed allocation because of their use of the 455-456 MHz band for auxiliary services under Part 74. ORBCOMM believes that these broadcast interests have failed to raise any legitimate objections to the allocation. Initially, ORBCOMM observes that a broadcaster's use of this band is already subject to a measure of interference from other broadcasters because the channel assignments to the broadcasters are non-exclusive.[2/] Moreover, their assumptions regarding the ability of the DCAAS and DCAAS-like systems to detect the broadcasters' usage of the band as part of the scanning process is incorrect. Some of the broadcasting commenters apparently believe the DCAAS system scans the band from a ground location, when in fact the scanning occurs on the satellite. In addition, although the DCAAS scanning occurs in discrete segments, that scanning is very sensitive and will detect a wider bandwidth

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2/ 47 C.F.R. §74.402(e).

channel's occupation of the smaller segment scanned by DCAAS. For the convenience of the commenters and the Commission, Attachment A hereto is a description of how the DCAAS system works and how it avoids harmful interference, including protections in addition to the active channel avoidance (such as geographic dispersion and relatively brief transmission bursts).

The comments of ABC present a scenario which it believes has the potential for causing interference to Auxiliary Broadcast receivers. A clearer understanding of the functioning of Little LEO systems indicates that interference is either not possible or the probability is so remote as to be insignificant.

The ABC comments describe a scenario involving interference to a live radio traffic report just as it comes on the air. The claim presented is that since the traffic report transmitter has not been active prior to the report, the DCAAS system will not sense the transmission and could assign that channel for a Little LEO subscriber transmission, resulting in a one-half second "blatt" being broadcast by the radio station. The sequence of events in this case would presumably be as follows (and assuming the remote broadcast will occur on a channel that has been assigned by the DCAAS to subscriber uplinks):

> The studio announcer begins his cue, the traffic reporter ("Charlie") starts to transmit. During the next two to three seconds the studio announcer completes his cue. During this same time, the Little LEO satellite would be receiving interference from Charlie's transmitter (because of the relatively higher power of the broadcaster's remote transmitter). After about the first second of interference to the satellite, the satellite would sense the high bit error rate (BER) condition and switch the subscriber transmitters to a different channel. It is not necessary for the satellite to complete a re-scan of the frequency band for the DCAAS system to stop using a given channel. The channel selection will change automatically due to excessive BER on a channel, rendering it unusable to the satellite system.
>
> If, due to an obstruction, the Little LEO satellite cannot sense Charlie's transmitter, it is possible for the satellite to continue to include that channel for possible use in the group of eligible uplink transmission channels. For this to happen, though, there must be no other terrestrial transmissions on this frequency within the satellite's

footprint. The footprint is an area approximately the size of the United States. Even assuming there are no other transmissions occurring within the footprint, the satellite would not necessarily assign the channel to subscriber uplinks. The DCAAS processor uses a complex algorithm, including historical usage, to determine which will be the "best" channels for the subscriber transmissions.

Assuming *arguendo* the satellite does assign Charlie's frequency for uplink transmissions, the transmitting Little LEO subscriber could be anywhere within the footprint of the satellite. The footprint is 5,000 km across, and so the probability that the Little LEO subscriber transmitting on Charlie's frequency is within a few tens of kilometers of Charlie's location (the exact distance depends on, *inter alia*, the relative power of the transmitter and sensitivity of the receiving antenna) is extremely low. Assuming further *arguendo* the transmitting Little LEO subscriber is close to Charlie, it is likely that the line-of-sight between the subscriber transmitter and the receiver at Charlie's studio is obstructed is relatively high since Charlie himself has an obstructed line-of-sight to the Little LEO satellite.

Even assuming *arguendo* Charlie's channel is assigned to a Little LEO subscriber transmitter, it is close to Charlie and it has a clear line-of-sight to Charlie's studio receiver, it is still unlikely that a 450 ms burst would be transmitted. 450 ms is a maximum length burst. The most common burst length is 60 ms, so ABC's assertion of half-second "blatts" is unrealistic.

In sum, the broadcasters' objections to the NVNG MSS use of the band (on essentially a secondary basis) are unfounded.

The land mobile incumbents object to the proposed allocation on two grounds: they claim that the studies demonstrating an ability of the NVNG MSS satellite systems to avoid harmful interference were inadequate, and they assert that the market studies to support the need for additional NVNG MSS spectrum were flawed. Neither of these claims are valid. The American Petroleum Institute appended a paper prepared in conjunction with the WRC-97 preparatory process by the LMCC in July, 1996, which criticized the Little LEO sharing studies. The Little LEO industry, however, has already refuted those charges in subsequent studies and papers submitted in the WRC preparatory process.

The Utilities Telecommunications Council once again argues that the market studies supporting the need for additional spectrum were overly optimistic, and thus no additional

spectrum is needed. In contrast to their speculation on utilities' use of Little LEO services for remote meter reading, ORBCOMM certainly believes that there will be significant demand for Little LEO services, and indeed has already expended over $250 million on its satellite system and terrestrial infrastructure. The other Little LEO applicants presumably also are prepared to invest significantly in their NVNG MSS satellite systems. ORBCOMM believes that these manifestations of the marketplace at work are the best evidence of a demand for Little LEO services. In addition, as ORBCOMM explained in its initial comments in this proceeding, there is an acute need for additional subscriber uplink spectrum, and the proposed allocation of the 455-456 MHz and 459-460 MHz bands is the best near-term solution.

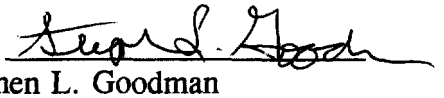
In any event, ORBCOMM believes that the Commission should allow the marketplace to decide what level of demand for these services develops. The Commission should not attempt to forecast demand and micromanage the spectrum, particularly in this situation where there will be no displacement or constraints imposed on the objecting incumbents. Indeed, their argument with regard to criticism of the demand studies appears to be largely irrelevant. If the demand develops like the Little LEO industry believes, then clearly the allocation was justified (and as explained previously, the incumbents are protected from harmful interference). If it does not, then there is even less of a risk of any harmful interference to the terrestrial users, who will continue to operate because they are not being displaced, relocated or constrained as a result of the allocation. Under these circumstances, the incumbents' attempt to challenge the market studies should not be of any decisional significance.

Finally, ORBCOMM disagrees with the objection of the petroleum industry to the proposed allocation. ORBCOMM does not intend to denigrate the importance of oil spill

clean up activities. However, there is nothing unique about the radio transmissions supporting those activities that would limit the effectiveness of the DCAAS-like scanning systems to detect and avoid Little LEO subscriber transmissions when the 459.000 MHz channel was occupied by those oil spill clean up activities (or even when that channel was being used by the Petroleum Radio Service on a secondary basis). Indeed, their comments do not explain why the secondary use by the Petroleum Radio Service, where there is a need affirmatively to notify those users to cease operations is acceptable, but that the Little LEO use on effectively a secondary basis where usage ceases automatically when the channel is used for terrestrial activities presents an unacceptable risk. At any rate, ORBCOMM does not believe that their objections pose any valid basis for not allocating the remainder of the 455-456 MHz and 459-460 MHz bands to the NVNG MSS as proposed by the Commission.

For the reasons set forth herein, as well as explained in greater detail in ORBCOMM's initial comments, the comments of Leo One and Final Analysis, and the extensive record developed in the WRC preparatory process, ORBCOMM continues to urge the Commission to allocate the 455-456 MHz and 459-460 MHz bands to the NVNG MSS.

Respectfully submitted,

By: 

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ATTACHMENT A
Interference Avoidance in the ORBCOMM System

The comments made by a number of entities seem to be based to some extent on a lack of knowledge concerning the interference avoidance techniques that must be used by Little LEO systems in order to operate in congested bands such as 455–456 MHz and 459–460 MHz. The following is a discussion of the interference avoidance techniques that ORBCOMM uses in the 148.0–149.9 MHz band. ORBCOMM has been operating in this band since April of 1995 without any incidents of interference.

The 148.0-149.9 MHz band is heavily used by terrestrial systems. In order to operate, the ORBCOMM system must scan and identify channels that are not being actively used. It is impossible for an FDMA system such as ORBCOMM to operate in the 148-149.9 MHz band without an approach such as DCAAS to identify channels being actively used by terrestrial services and to avoid those channels. Any attempt to receive on a channel being actively used by a terrestrial transmitter would result in interference to the satellite and a total loss of the Little LEO transmissions.

The overall sharing approach used by ORBCOMM is based on the following five principles:

- The DCAAS system, located on the satellite, avoids assigning active terrestrial Mobile channels (eirp toward the satellite > 0.1 W in 7.5 kHz) to ORBCOMM's Mobile Earth Stations (MESs) for uplink transmissions. The system scans the frequency band for active channels approximately every five seconds. The active channel could be anywhere within the 5,000 km diameter footprint of the satellite. The DCAAS system will not permit the MESs to transmit if there are no inactive channels available.

- Should the DCAAS system inadvertently assign an active channel, there is a very low probability that a transmitting MES is sufficiently near to a receiving mobile unit to be detected. The satellite antenna beam is 5,000 km across, only one MES transmits at a time on a given frequency and it could be anywhere within this footprint. Only an MES within several tens of kilometers of the receiving mobile unit could be detected by the terrestrial receiver.

- If a channel selected by DCAAS receives interference, DCAAS will, within about one second, select a different channel.

- The short burst duration (450 ms maximum, less than 60 ms most common) further minimizes any interference effects.

- The structure of the MES message transmission session is such that even if interference does occur, it will not continue or re-occur. Consecutive transmissions must be on different frequencies.

These principles make it possible for ORBCOMM to avoid interfering with terrestrial services. ORBCOMM is licensed in the 148-149.9 MHz band in the United States, where the uplink band is shared with military radio systems, and in Canada, where the band is used for safety of life services such as ambulance dispatch.